Abstract of the Disclosure

A wireless communication system includes a transmitter and a receiver. The transmitter includes multiple groups of transmit antennas. Input symbols are generated and then orthogonal space-time block is encoded to produce a data stream for each group of transmit antennas. Each data stream is adaptively linear space encoded to produce an encoded signal for each transmit antenna of each group according to feedback information for the group. The receiver includes a single receive antenna, a module for measuring a phase of a channel impulse response for each transmit antenna. The feedback information is determined independently for each group of transmit antennas from the channel impulse responses. The feedback information for each group of transmit antennas is sent to the transmitter.